

U.S. Patent 5,082,362 issued on January 21, 1992 to Schneiter is referred to herein as "Schneiter".

U.S. Patent 5,117,126 issued on May 26, 1992 to Geiger is referred to herein as "Geiger".

Status of Claims

Claims 1 and 4-5 are herewith amended by Applicant to better and more specifically describe that which Applicant considers to be the invention. New claim 7 is herewith added by Applicant. Claims 1-7, as amended, are pending in the application.

Claims 1-3 and 5 are rejected under 35 U.S.C. §102(e) for anticipation by Contarino.

Claim 4 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Schneiter.

Claim 6 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Geiger.

Summary of Amendment

Claims 1 and 4-5 are herewith amended by Applicant to better and more specifically describe that which Applicant considers to be the invention. Basis for the amendments may be found in the specification on page 6 at lines 11-14. New claim 7 is herewith added by Applicant. Basis for new claim 7 may be found in the specification on page 6 at lines 22-23. Applicant respectfully requests reexamination and reconsideration of all claims, as amended. No additional fee is required for this amendment.

Response to Rejection of Claims 1-3 and 5 under 35 U.S.C. §102(e)

Reference is made to M.P.E.P. §2131, which states:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Claims 1-3, and 5 are rejected under 35 U.S.C. §102(e) for anticipation by Contarino. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because Contarino does not disclose each and every element as set forth in the claims. Firstly, Contarino describes a classical lidar system that illuminates the target with a single pulse, which is brief enough to permit simple discrimination of ocean surface and submerged target [col. 4 at lines 6-19] but Contarino neither considers nor suggests the concurrent **temporal and spatial discrimination** of lines and pixels as taught and claimed by Applicant in the present application. Applicant amended claim 1 to clarify the "spatial discriminator" aspect of the "line scan" element of the invention,

which is described at page 6 at lines 11-13 of the specification and which is neither taught nor suggested by Contarino.

Secondly, Contarino neither teaches nor suggests any means for assembling and displaying an **image** of a target as taught and claimed by Applicant for the **imaging** lidar system of the present application. Contarino merely detects an object by sensing a reflection or “echo” of the single laser pulse launched into an underwater environment. As claimed, Applicant teaches a “line-scan” technique for accumulating a matrix of pixels making up a complete visual image of the underwater target (Applicant claims an “imaging” lidar). This invention uses the “line scan” technique to scan the area containing the target and to generate a “scanned” image of the target. Contarino does not mention scanning, and is interested only in displaying the temporal waveform of the single-pulse light echo signal on an oscilloscope-type display, in which he can distinguish surface and target echos for a single pulse but which does not represent an **image** of anything.

Thirdly, Contarino neither teaches nor suggests the **gating** element of the invention as taught and claimed by Applicant in the present application. As described in the specification at page 6, “range gating” is distinct from and should not be confused with the “ranging” concept used by Contarino. **Range gating** denotes a **temporal-discrimination** process wherein a detector is shuttered or blocked so that no light is received except for a very short gating time (nanoseconds) when the shutter is open. The shutter opening is delayed with respect to the launching of each of many laser pulses and the brief light echo signal received during the “gating” period corresponds to a single “pixel” within a temporal “slice” of the target. Conversely, as clearly taught by Contarino, **ranging** denotes a process where a clock, which was started upon the launch of a laser pulse toward a target, is halted upon detection of light back-scattered from the target so that the round-trip transit time can be used to determine the distance to the target. The detector for a ranging application is never blocked, which allows backscattered light to enter the detector for the entire duration of the laser pulse transit, increasing noise and preventing any “temporal discrimination” of imaging data. Although Contarino is unconcerned with imaging, these disadvantages of the “ranging” technique oblige him to add a radar modulation of his single laser pulse to permit stochastic analysis (needed to compensate for the lack of available temporal discrimination) of the ranging echo to improve target detection performance [col. 9]; a measure that is unnecessary in view of Applicant’s teachings in the present application. Applicant amended claim 5 to clarify the “temporal discriminator” aspect of the range “gating” element of the invention, which is described at page 6 at lines 13-21 of the specification and which is neither taught nor suggested by Contarino.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §102(e) rejections of claims 1-3 and 5, as amended.

Response to the rejections of claims 4 and 6 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

“After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claim 4 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Schneiter. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action. The above discussion of Contarino demonstrates that Contarino does not anticipate the base claim 1 from which Applicant’s claim 4 depends. Moreover, the proposed combination of Contarino and Schneiter is missing several elements of Applicant’s claim 4. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter. The office action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Under applicable due process regulations, Applicant is entitled to at least one opportunity to rebut a properly-substantiated argument (*prima facie case*) for obviousness compliant with M.P.E.P. §706.02 responsive to a non-final action.

Applicant respectfully asserts that Schneiter in fact neither teaches nor suggests a lidar target imaging device but instead discloses video camera system. Moreover, although Schneiter mentions an **encoder** pulse rate that does not exceed 500 kHz, Applicant respectfully asserts that this **encoder** rate is completely unrelated to the claimed **pulse laser** repetition rate (an encoder operates to report the position of a moving shaft and a pulse laser operates to emit light pulses). Applicant has amended claim 4 to more clearly specify that the pulse laser rate of the imaging lidar of claim 4 is preferably greater than 600KHz. Nothing in the Schneiter reference in any way suggests the operating of an imaging lidar above 600 KHz; even the Schneiter encoder chip operates no higher than 500 KHz.

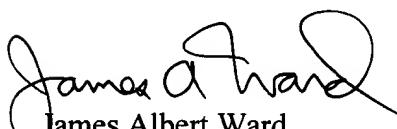
Claim 6 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Geiger. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action. The above discussion of Contarino demonstrates that Contarino does not anticipate the base claim 1 from which Applicant's claim 6 depends. Moreover, the proposed combination of Contarino and Geiger is missing several elements of Applicant's claim 6. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter. The office action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Under applicable due process regulations, Applicant is entitled to at least one opportunity to rebut a properly-substantiated argument (*prima facie case*) for obviousness compliant with M.P.E.P. §706.02 responsive to a non-final action.

Applicant respectfully asserts that Geiger neither teaches nor suggests a periodically-poled crystal pulsed laser but instead describes a multi-crystal parametric optical oscillator. In fact periodically-poled crystal material of the type described and claimed by Applicant in the present application was unknown in the art until it first became commercially available in 1998, about eight years after the filing date of the Geiger reference.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejections of claims 4 and 6, as amended.

Conclusion

For the reasons set forth above, Applicant respectfully requests reexamination of claims 1-6, as amended, and examination of new claim 7. Applicant respectfully solicits allowance of claims 1-7 at an early date. No additional fee is required for this amendment.


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